



Influence of colloid particles on the transport of formaldehyde in unsaturated porous media

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Colloids can bind a variety of contaminants and play an important role in facilitating their transport in subsurface formations. The objective of this study is to investigate the effects of two representative colloid-sized clay particles (kaolinite, montmorillonite) on the transport of formaldehyde in unsaturated porous media. Formaldehyde (FA) is a compound that is used extensively in medicine, industrial processes and agriculture as a disinfectant for killing bacteria and fungi. Transport experiments were performed in columns packed with quartz sand, under unsaturated conditions. The transport of FA was examined with and without the presence of suspended clay particles under various flow rates (1, 1.5, 2 and 3 ml/min) and various levels of saturation. The experimental results clearly suggested that the presence of suspended clay particles (both kaolinite and montmorillonite) enhanced the transport of FA in unsaturated packed columns. Moreover, it was shown that clay particle breakthrough was sensitive to the water content. More specifically, the mass of clay particles retained in the column increased with decreasing level of water saturation.